Appendix B

Urban/Suburban Implementation Plan

LOWER BOISE RIVER

Total Maximum Daily Load
Urban/Suburban Source

IMPLEMENTATION PLAN

Prepared for the
Idaho Department of Environmental Quality

December 2003

Lower Boise River Total Maximum Daily Load
Urban/Suburban Implementation Plan
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I. Introduction

This *Total Maximum Daily Load Urban/Suburban Source Implementation Plan (Plan)* identifies implementation activities designed to reduce pollutants in discharges to the Lower Boise River and its tributaries from urban and suburban land use activities. The emphasis is on sources within municipalities and rural residential subdivisions with the potential to contribute pollutants to hard surfaces that can then be transported to receiving waters via storm water runoff.

The purpose of this source plan is to describe actions that will be taken to ensure compliance with the Lower Boise River Total Maximum Daily Load (TMDL), to provide information to the public about urban runoff mitigation activities; and to provide guidance to the stakeholders, those entities that are required to reduce pollutants in their storm water discharges. As guidance, this Plan is intended to provide an understanding of the federal requirements for storm water management, the tools available for improving storm water quality, and a process for implementing programs to achieve TMDL pollutant reduction targets.

II. Goal and Objectives

The goal of the Plan is to address the reduction of existing pollutant loads and the prevention of future increases of sediment, bacteria, and coincidentally temperature increases and nutrient loading from urban and suburban land use activities. This Plan focuses on achievement of the sediment load allocations and bacteria load requirements established by the Lower Boise River TMDL. The completion of the lower Snake River and Brownlee Reservoir TMDLs may result in temperature reductions and phosphorus allocations in the lower Boise River watershed. Therefore activities that reduce phosphorus in runoff and control temperature, along with sediment and bacteria, are also discussed in this Plan. Under the Adaptive Management framework adopted in this watershed, potential activities that reduce and control temperature will be reviewed within the context of the final Snake River and Brownlee Reservoir TMDLs.

The implementation strategy is a tiered approach to pollutant reduction that:

1) Documents existing activities that control pollutants in storm water runoff;
2) Accounts for the pollutant reductions inherent in land use changes associated with the conversion of agricultural land to urban land uses;
3) Relies on reductions associated with the development and implementation of programs required by the federal storm water regulations; and
4) Provides for the implementation of specific projects or activities designed to achieve additional reductions in identified priority areas.

This approach is provided to ensure that the combination of activities will achieve the necessary pollutant reductions synergistically, mutually supporting and reinforcing stakeholder activities. The following Plan objectives have been identified to achieve the goal of pollutant reduction:

- Integration of TMDL implementation activities and the federal Phase II storm water requirements
- Adaptive management through the use of best management practices (BMPs) and measurable goals with built-in milestones for determining effectiveness and making adjustments
- Partnerships to improve efficiency through shared resources and optimize effectiveness by focusing on watershed priority areas

III. Urban and Suburban Sources

This section identifies the jurisdictions with urban and suburban sources within the Lower Boise River watershed; discusses the characteristics of storm water runoff, and identifies the reductions required by the Lower Boise TMDL for pollutants in storm water runoff.

Jurisdictions as Stakeholders

Entities with responsibilities for the management of storm water are located in Ada and Canyon counties, and the communities of Boise, Garden City, Eagle, Meridian, Star, Kuna, Nampa, Caldwell, Middleton, Notus, and Parma. Stakeholders have been identified as entities that operate systems that receive storm water runoff from or have jurisdiction over urban and suburban land use activities that have the potential to contribute pollutants to urban runoff. Stakeholders include local governments (e.g. counties, municipalities, highway districts, drainage districts) and state government (e.g. Idaho Transportation Department, Boise State University). All jurisdictions that own, operate or maintain a storm water system, which discharges directly or indirectly into the Boise River must identify actions to reduce their discharge of pollutants.

Storm Water Runoff Characteristics

Storm water runoff has unique characteristics that must be considered in developing a pollutant reduction strategy. Land development contributes to the problem through the creation of impervious surfaces such as city streets, driveways, parking lots, and sidewalks. Impervious areas act as a collector for pollutants from concentrated human activities. Pollutants can fall out of the sky during dryfall or they may arrive in rain or snow as wetfall. Pollutants can also be blown in from adjacent pervious areas. Pollutants land on the street where they often stay in curbs, cracks and other areas until the next rainstorm where they are washed off the surface and into the storm drain system and ultimately to receiving streams.

There are a multitude of different land use activities that have the potential to contribute pollutants to storm water runoff. Pollutants are many and can include sediment, bacteria, and chemicals such as oil and grease, pesticides, heavy metals, and nutrients (e.g., nitrogen and phosphorus).

Another concern is the possible illicit connections to the storm drain systems. Sanitary sewer connections can result in fecal coliform bacteria entering the storm sewer system, and floor drains can contribute other non-storm water discharges.

In addition to water quality impacts, land development impacts the hydrology and geomorphology of the receiving water, and affects aquatic and riparian habitats. Development results in impervious surfaces that eliminate the natural retention provided by vegetation and soil in an undeveloped area. Increasing impervious surfaces increases the quantity of water delivered to the waterbody during storms. This results in increased runoff with more rapid peak discharges. Changes in the volume and timing of runoff can result in stream widening and erosion, decreased channel stability, embeddedness and decreased substrate quality.

An increase in impervious surface also decreases the amount of rainfall available for infiltration. During dry weather periods, urban streams tend to have less flow because groundwater recharge and stormwater infiltration has been diminished. Without infiltration, the groundwater will not be recharged and the stream will lose this potential source of water.

Along with changes in hydrology, geomorphology, and water quality associated with increased impervious cover, the habitat associated with urban streams diminishes. There are numerous impacts to the aquatic habitat as well as the riparian corridor. With increased urbanization, there is a corresponding decline of habitat quality and consequently a decline in plant and animal diversity, particularly along the streamside zone.

The effects of storm water runoff on the beneficial uses of receiving waters are difficult to isolate and characterize because of the nature of urban runoff. Storm water discharges are short-term and intermittent, not continuous. As such, traditional methods of analysis and control for water quality protection are not appropriate. For example, application of chronic water quality standards (and to some extent even acute water quality standards) to intermittent, short-term discharges is not appropriate because the existing standards are based on longer term testing to derive dose-response relationships. Understanding is complicated by a lack of sufficient data and high variability in the available monitoring data.

Likewise, the relationship between outfall discharges and the sources of pollutants is complicated by several factors. The drainage patterns in the lower Boise River watershed have been altered by irrigation practices. Water does not follow natural drainage paths in much of the lower Boise valley. Stream alterations and man-made waterways have created new drainage areas that are significantly different from the natural subwatershed areas (DEQ, 1999).

Many existing drainage ways were built over and downstream outlets eliminated which created situations where there were no options for surface discharge of runoff. As a consequence of limited disposal options and the costs associated with developing a public storm drain system; many local governments in the Lower Boise River watershed require on-site control of post-development runoff. In many areas, it is now the responsibility of the developer to control drainage and storm water runoff on his property.

The short-term intermittent nature of runoff, the lack of connectivity of many drainage systems, and the on-site detention requirements must all be considered in evaluating storm water runoff and its impacts. Methods used to estimate runoff or pollutant loading fail to account for these factors and can result in biased conclusions.

Lower Boise River Pollutants of Concern

The Lower Boise River TMDL includes allocations for sediment and bacteria. The goal of the load and wasteload allocations was to create target loads for tributaries and wastewater treatment facilities that create conditions by which the targets for suspended sediment are met in the river. The load and wasteload allocations were designed such that they will maintain the 50 mg/L and 80 mg/L targets in the Boise River. The application of targets is annual, not seasonal; however, the critical period on which the TMDL was based is seasonal (February 15 through June 14) because this is the period that coincides with when the lowest mainstem flow coincides with the largest sediment inputs to the river. Monitoring should, at a minimum, occur in this time frame to determine whether load reductions during this period are being achieved. The loads were developed to ensure that, with a sufficient margin of safety, the 50 mg/L target would be met at all locations in the Boise River given seasonal 30-day minimum flows.

Using the mass balance approach, analysis showed that total suspended sediment targets were met upstream from Middleton. Thus, three contributing areas (the Riparian Area #1, Eagle Drain, and Thurman Drain) upstream from Middleton were assigned sediment loads equal to the 1995 loads used to develop the TMDL. Implementation of Phase I stormwater requirements (including the application of 12 stormwater BMPs listed in Appendix K of the TMDL) are expected to be sufficient to meet the goals of the TMDL. Likewise, implementation of Phase II requirements above Middleton are expected to be sufficient to meet the goals of the TMDL. For other unregulated non-point sources above Middleton, including those within Riparian Area #1, Eagle Drain, and Thurman Drain, implementing reasonable control activities (e.g., BMPs) to maintain current sediment loads is expected to be sufficient to meet the goals of the TMDL.

Tributary loads below Middleton must be reduced by 37 percent in order to meet the 50 and 80 mg/L targets in the river. Since 1992 had the lowest flows on record since 1928, it represented an extreme, and rare low flow condition that created stringent load reduction requirements. The reduction percent (37) was applied to median year (1995) total suspended sediment loads for each tributary to determine load allocations.

Sediment is a common pollutant in urban stormwater. Sediment can smother bottom organisms and it can clog gills of fish and aquatic insects when it is in the water column. Sources of sediment include streambank erosion, construction sites, and the wash off from paved surfaces. Sediment runoff rates from construction sites are typically 10 to 20 times greater than those of agricultural lands.

The target for bacteria in the Boise River is based upon the state criteria for primary and secondary contact recreation. The TMDL concluded that the tributaries to the lower Boise River are significant sources of bacteria loading to the river, and generally will have to reduce bacterial counts to levels close to the state bacteria criteria in order to protect contact recreation beneficial uses. The TMDL indicated that the tributaries and drains below Glenwood Bridge should be able to meet a geometric mean of 50 coliform forming units (colonies) per 100 mL (CFU/100 mL) where they enter the river. This is because downstream of Glenwood Bridge, the river exceeded the existing bacteria standards and no in-river dilution was available for other sources.

Since the TMDL was developed, *E. coli* has replaced fecal coliform as the state water quality standard (126 *E. coli*/100 ml). Thus, compliance with the lower Boise River bacteria TMDL will be evaluated using the applicable E. coli state water quality standards to maintain the intent of the TMDL (to protect human health using the applicable standard).

Nationwide, fecal coliform levels in urban stormwater runoff are typically 15 to 50 times the standard set for water contact recreation. The origins of urban bacterial loads are diverse, and may include leakage from sanitary sewers and direct loading of human fecal matter, as well as bacteria derived from dog and cat feces. High levels of bacteria may be due to leaks of human sewage from sanitary sewer leaks, leaking septic systems, or illicit discharge of sewage. Ducks and geese or other avian species also contribute to bacteria levels. Any lake or stream or adjacent area where these birds forage or swim could harbor high levels of pathogens. Similar findings also appear to be evident in the Lower Boise River system, as explained in more detail in the overall implementation Plan.

The draft <u>Snake River – Hells Canyon TMDL</u> (SR-HC) includes allocations for phosphorus (0.07 mg/l total phosphorus) that will require additional limitations on the discharges to the Boise River. The nonpoint source allocation and appropriate action identified in the draft TMDL is implementation of BMPs in tributaries to reach 0.07 mg/l at inflow to the Snake River. Urban and suburban sources of phosphorus include fertilizers from lawns and golf courses, leaking septic systems, and animal waste.

The draft Snake River – Hells Canyon TMDL also addresses temperature and identifies a target for the protection of salmonid rearing/cold water aquatic life of 17.8°C (expressed in terms of a 7-day average of the maximum temperature) if and when the natural background (identified in the draft SR-HC TMDL as "site potential") is less than 17.8°C. If and when the natural background (identified in the draft SR-HC TMDL as site potential) is greater than17.8°C, the target is no more than a 0.14°C (0.25 °F) increase from anthropogenic sources.

Tributary temperature load allocations apply at the mouth of the tributary only for Idaho tributaries and are no more than a 0.14°C (0.25 °F) increase from anthropogenic sources. Because the tributaries were not assessed for temperature increase due to anthropogenic sources as part of the SR-HC TMDL, an assessment of natural and anthropogenic temperature loading influences in each of the inflowing tributaries will be necessary as part of the tributary TMDL processes.

The temperature of surface runoff during storm events increases as a result of urbanization and the accompanying increase in impervious areas. Urban development can also lead to wider channels and more surface ponds with greater exposure of stormwater to solar radiation, further increasing the runoff temperature. Due to the nature of the lower Boise River Valley climate, storm events resulting in rainfall runoff in hot summer months are infrequent. Stormwater monitoring data are largely absent during this time period, but temperature is expected to be an issue when there are storms (e.g., thermal heating from hot pavement causes warmer runoff during summer storms).

IV. Federal Storm Water Requirements

The timing of Phase II of the federal storm water regulations and the Lower Boise River TMDL provides an opportunity for some stakeholders to create a storm water program designed to achieve the objectives of both sets of requirements. The federal storm water requirements are a phased approach to the regulation of discharges from separate storm sewer systems (MS4s) through the National Pollutant Discharge Elimination System (NPDES) permitting program. A MS4 means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) designed or used for collecting or conveying storm water (40 CFR 122.26(b)(8)).

The Phase I storm water program covers medium and large MS4s. The Phase II storm water regulation covers a certain subset of small MS4s. Entities other than local governments may be regulated, including the Idaho Department of Transportation, highway districts that operate within regulated areas, universities, hospitals, prisons, drainage districts, irrigation districts if they meet the definition of a MS4.

The Boise are is regulated under Phase I of the storm water requirements. An NPDES Storm Water Permit was issued in November 2000 to Boise area MS4 owners and operators. Co-pemittees include Boise City, the Ada County Highway District, Drainage District 3, Garden City, Region 3 of the Idaho Transportation Department, and Boise State University. The permit obligations for these entities go beyond the requirements that must be addressed by Phase II MS4s.

Entities Regulated Under Phase II

A small MS4 may be designated as regulated by the Environmental Protection Agency (EPA) in three ways:

- Location within the boundaries of a Census Bureau-defined Urbanized Area (UA) based on the 2000 census
- Located outside of UA but contribute substantially to pollutant loadings of a physically interconnected, regulated MS4
- Located outside of UA with a population of at least 10,000 and population density of at least 1,000 people per square mile and meet certain designation criteria

The designation criteria that will be considered by EPA in determining which small MS4 include:

- Discharge storm water to sensitive waters
- Significant contributor of pollutants to waters of the United States
- Densely populated
- Experienced high population growth over the last 10 years
- Contiguous to an Urbanized Area
- Physically interconnected to another regulated MS4
- Storm water runoff not effectively addressed by other water quality programs

In addition, EPA considers MS4s with load allocations through an EPA-approved TMDL as significant contributors of pollutants to waters of the United States.

EPA's preliminary list of candidate communities that are within regulated Urban Areas for Phase II includes the following local governments in the Treasure Valley[1]:

- Portions of Ada County
- Caldwell
- Portions of Canyon County
- Eagle
- Meridian
- Middleton
- Nampa

Star, Kuna, Notus, and Parma are not identified but the list of designated entities may expand once EPA has completed their designation process. While these communities may not be required to comply with the Phase II storm water regulations, they are still required by the Lower Boise River TMDL to implement activities to reduce pollutants of concern in their discharges. The control measures identified in the Phase II rule for reducing pollutants in storm water runoff are the same activities that communities not subject to the Phase II Rule should consider in determining how to meet the Lower Boise River TMDL requirements.

Municipalities and counties are not the only entities affected by Phase II requirements. Any other public entity within an urbanized area, which operates a municipal separate storm sewer system, as defined by EPA, is also subject to these requirements. This includes drainage districts, highway districts, and state or federal facilities. The Ada County Highway District, and portions of the Notus Parma, Nampa, and Canyon Highway Districts have been included within the boundaries of regulated urbanized areas.

Storm Water Permitting Approach

The EPA has adopted an interim permitting approach for regulating storm water discharges (EPA, 1996). Due to the nature of storm water discharges, and the typical lack of information on which to base numeric water quality-based effluent limitations (expressed as concentration and mass), EPA uses an interim permitting approach for NPDES storm water permits.

The interim permitting approach uses best management practices (BMPs) in first-round storm water permits, and expanded or better-tailored BMPs in subsequent permits, where necessary, to provide for the attainment of water quality standards. The Phase II storm water requirements require a MS4 operator to design a storm water management program so that it:

[1] Although Boise City and Garden City meet the size requirements for Phase II stormwater, these entities are already covered under the Phase I stormwater program.

- Reduces the discharge of pollutants to the “maximum extent practicable” (MEP);
- Protects water quality; and
- Satisfies the appropriate water quality requirements of the Clean Water Act.

MS4s covered under Phase II are not required to show numerical results to substantiate that they are improving their water quality. Instead they are allowed to rely on the use of BMPs to meet the required minimum measures, to the “maximum extent practicable”.

There is no regulatory definition of MEP in order to allow the permitting authority and regulated MS4s maximum flexibility in their interpretation of it as appropriate. Compliance with the technical standard of MEP requires the successful implementation of approved BMPs. The Phase II Final Rule considers narrative effluent limitations that require the implementation of BMPs and the achievement of measurable goals as the most appropriate form of effluent limitations to achieve the protection of water quality, rather than requiring that storm water discharges meet numeric effluent limitations.

Measurable Goals

Measurable goals are described in the Phase II rule as BMP design objectives or goals that quantify the progress of program implementation and the performance of BMPs. They are milestones used to track the progress and effectiveness of BMPs in reducing pollutants to the MEP. They can be used to assess compliance with both NPDES permit and TMDL requirements. Measurable goals will enable local governments, the Idaho Department of Environmental Quality (IDEQ) and EPA to gauge administrative compliance and measure water quality improvements.

There are a number of different ways to establish measurable goals based on one or more of the following general categories:

1. *Tracking implementation over time.* Where a BMP is continually implemented over the permit term, a measurable goal can be developed to track how often, or where, this BMP is implemented.

2. *Measuring progress in implementing the BMP*. Some BMPs are developed over time, and a measurable goal can be used to track this progress until BMP implementation is completed.

3. *Tracking total numbers of BMPs implemented*. Measurable goals also can be used to track BMP implementation numerically, e.g., the number of wet detention basins in place or the number of people changing their behavior due to the receipt of educational materials.

4. *Tracking program/BMP effectiveness*. Measurable goals can be developed to evaluate BMP effectiveness, for example, by evaluating a structural BMP's effectiveness at reducing pollutant loadings, or evaluating a public education campaign's effectiveness at reaching and informing the target audience to determine whether it reduces pollutants to the MEP. A measurable goal can also be a BMP design objective or a performance standard.

5. *Tracking environmental improvement*. The ultimate goal is environmental improvement, which can be a measurable goal. Achievement of environmental improvement can be assessed and documented by ascertaining whether state water quality standards are being met for the receiving waterbody or by tracking trends or improvements in water quality (chemical, physical, and biological) and other indicators, such as the hydrologic or habitat condition of the waterbody or watershed. (EPA, 2000)

Measurable goals contain descriptions of actions taken to implement each BMP, what will be achieved by each goal, and the frequency and dates for such actions to be taken. A baseline is established against which future progress at reducing pollutants to the MEP can be measured. For example, information on current water quality conditions, numbers of BMPs already implemented, and the public's current knowledge/awareness of storm water management are useful in setting this baseline.

The requirement of identifying measurable goals for each control measure is unique to Phase II. While communities regulated under Phase I were not required to devise measurable goals, they are required to assess the effectiveness of programs and activities and conduct storm water outfall monitoring to characterize storm water runoff.

V. Implementation Strategy

This section includes a discussion of the implementation strategy, a tiered approach to pollutant reduction that accounts for:

1) Existing activities that control pollutants in storm water runoff;
2) The pollutant reductions inherent in land use changes associated with the conversion of agricultural land;
3) Pollutant reductions associated with the development and implementation of programs required by the federal storm water regulations; and
4) Specific projects or activities designed to achieve additional reductions in identified priority areas.

This approach is provided to ensure that the combination of activities will achieve the necessary pollutant reductions synergistically, mutually supporting and reinforcing stakeholder activities.

Documenting Existing Activities

Using the mass balance approach, analysis showed that total suspended sediment targets were met upstream from Middleton. Thus, three contributing areas (the Riparian Area #1, Eagle Drain, and Thurman Drain) upstream from Middleton were assigned sediment loads equal to the 1995 loads used to develop the TMDL. Implementation of Phase I stormwater requirements (including the application of 12 stormwater BMPs listed in Appendix K of the TMDL) are expected to be sufficient to meet the goals of the TMDL. Likewise, implementation of Phase II requirements above Middleton are expected to be sufficient to meet the goals of the TMDL. For other unregulated non-point sources above Middleton, including those within Riparian Area #1, Eagle Drain, and Thurman Drain, implementing reasonable control activities (e.g., BMPs) to maintain current sediment loads is expected to be sufficient to meet the goals of the TMDL. Tributary loads below Middleton must be reduced by 37 percent in order to meet the 50 and 80 mg/L targets in the river.

The target for bacteria in the Lower Boise River is based upon the state criteria for primary and secondary contact recreation. The TMDL concluded that the tributaries to the Lower Boise River are significant sources of bacteria loading to the river, and generally will have to reduce bacterial counts to levels close to the state bacteria criteria in order to protect contact recreation beneficial uses. The TMDL indicated that the tributaries and drains below Glenwood Bridge should be able to meet a geometric mean of 50 coliform forming units (colonies) per 100 mL (CFU/100 mL) where they enter the river. This is because downstream of Glenwood Bridge, the river exceeded the existing bacteria standards and no in-river dilution was available for other sources.

Since the TMDL was developed, *E. coli* has replaced fecal coliform as the state water quality standard (126 *E. coli*/100 ml). Thus, compliance with the lower Boise River bacteria TMDL will be evaluated using the applicable E. coli state water quality standards to maintain the intent of the TMDL (to protect human health using the applicable standard).

In some cases, particularly in the case of entities already covered by a Phase I NPDES permit; the MS4 operator may already have a program or activity in place and functioning, which controls the discharge of pollutants in storm water runoff and is sufficient to meet the requirements of the TMDL. In this case, the program or activity should be identified and well documented but no additional activities may be necessary.

Boise area co-permittees were issued an NPDES Storm Water Permit in November 2000. Co-permittees include Boise City, the Ada County Highway District, Drainage District 3, Garden City, Region 3 of the Idaho Transportation Department, and Boise State University. These entities have built upon existing programs and developed and implemented new programs and activities to address Phase I federal storm water requirements. These actions are identified in an annual report submitted to the Environmental Protection Agency and represent a significant effort to achieve pollutant reductions. A copy of the annual report in available at the Boise State University library. Summary information about the Boise City program can be accessed at the City's website.

Other communities in the lower Boise River watershed have existing requirements for on-site control of post-development runoff. Infiltration practices are typically used to meet these requirements, which limits or eliminates off-site discharges and associated impacts to receiving waters. These programs and other existing activities that address the Phase II minimum measures should be identified and well documented to demonstrate compliance with the requirements of the NPDES permit and the Lower Boise TMDL.

Land Conversion and Associated Pollutant Load Reductions

Land in the Treasure Valley is rapidly transitioning from agricultural uses to urban uses. Changes in land use will continue to occur throughout the implementation process and into the future. This land-use transition changes the contributing load, as well as the fate and transport complexity of sediment and other pollutants to the river.

The management of impacts from land use changes can result in achievement of the TMDL reduction goals when BMPs are applied. When agricultural activities are the existing land use, the management of development impacts may actually result in a net decrease in pollutant loading. The end result is a load reduction from agricultural land uses and a reduction credit for urban land uses that should be accounted for.

Land development under the jurisdiction of Phase II – regulated entities offers opportunities to achieve pollutant reductions when development is subject to requirements during the construction and post-construction phases that reduces or eliminates off-site storm water caused impacts that might otherwise occur. When development is permitted to occur as "business as usual" an opportunity to achieve pollutant reductions is lost and other mitigation measures may be necessary.

Implementation Activities Associated with Federal Requirements

The third component of the implementation strategy is based on the integration of TMDL requirements with the measures required of local governments that are currently regulated under Phase I or will be regulated under Phase II of the federal storm water regulations.

Local governments in the Treasure Valley must comply with federal requirements for storm water quality control. Boise area co-permittees have been implementing programs for several years to reduce the pollutants in storm water runoff as the result of conditions contained in an NPDES storm water permit. Phase II of the federal storm water regulations will affect public owners or operators of regulated small MS4s in parts of Canyon and Ada counties. Many entities that operate MS4s will be required to obtain storm water NPDES permits from the EPA and implement management programs intended to reduce the amount of pollutants in their storm water runoff discharges.

Stakeholders will develop storm water management programs that identify activities and schedules for implementation that address six minimum measures. The emphasis will be on program components that reflect site-specific characteristics of the municipality (e.g., population density, land use, age of communities, soil type, topography), the municipal storm sewer system, and the receiving waters. Implementation priorities are set to target the sources of specific pollution problems from certain land uses or target the problems resulting from the land use activities of a specific geographic area.

The Phase II storm water requirements require a MS4 operator to design a storm water management program so that it:

- Reduces the discharge of pollutants to the "maximum extent practicable" (MEP);
- Protects water quality; and
- Satisfies the appropriate water quality requirements of the Clean Water Act.

The main requirement of the permits will be for the MS4 operator to develop and implement six storm water management programs, or minimum measures. These measures are:

1. Public education and outreach
2. Public participation/involvement
3. Illicit discharge detection and elimination
4. Construction site storm water runoff control
5. Post-construction storm water management
6. Pollution prevention/good housekeeping for municipal operations

Each stakeholder will select appropriate BMPs after considering their situation and objectives for each minimum measure. The BMPs chosen should work toward one or more common program objectives related to storm water quality improvement and should reduce pollutants to the MEP. These objectives and subsequent program implementation activities should reflect TMDL requirements. The objectives should be based on what is known about existing pollutant sources and problems in the watershed(s) and what is required by the minimum measure. The objective can be something that can be quantified, or it can be a goal or purpose statement.

Measurable goals to be achieved must also be identified for each of the BMPs that comprise a MS4's storm water management program. The evaluation methods chosen for each BMP should lead to a determination of the environmental benefits of each minimum measure and the overall effectiveness of the storm water management program in reducing pollutants to the MEP.

A five-year schedule for implementing various program components should be developed that includes milestones and measurable goals for the six minimum measures, with intermediate goals when appropriate. Key dates could be included for public comment and review, local authority approval, stakeholder meetings, acquiring funding, and any other institutional, funding, and legal issues that must be addressed before implementation can occur.

Stakeholders should review the programs (municipal or other) that are already in place for each minimum measure. They are encouraged to coordinate with other agencies, non-profit groups, citizen groups, etc., to identify existing initiatives that can be used as part of the storm water management program.

Appendix A includes a table which lists possible implementation approaches for the six minimum measures and criteria for selecting the appropriate program actions and activities for each stakeholder's situation. While some practices target specific pollutants, many activities reduce the range of pollutants found in storm water runoff.

Criteria Discussion

BMP selection is based upon application of the criteria that address the objective identified above and meets the regulatory requirements in the minimum measure. Selected BMPs should complement each other and work toward meeting each minimum measure. This section includes a discussion of suggested criteria for selecting BMPs.

Targets Sediment

Sediment reduction has been identified as a BMP criterion because of the requirements of the TMDL. Efforts to reduce discharges of suspended sediment to the storm drain system by controlling activities at the source should focus on construction and post-construction measures. Measures that maintain pre-development hydrology are also fundamental to meeting sediment reduction requirements. Developing a program to address streambank erosion could reduce in-stream sources of sediment. Maintenance activities such as street sweeping and clean out of catch basins also reduce sediment loads to the River.

Targets Bacteria

Bacteria reduction has been identified as a BMP selection criterion because of the requirements of the TMDL. Source controls are the most effective way to achieve bacteria reduction. Source control seeks to reduce or eliminate sources of bacteria in urban watersheds before they come into contact with stormwater. Common source control programs focus on pet waste cleanup, proper disposal of kitty litter, septic system maintenance, discouraging resident waterfowl and general urban housekeeping.

In watersheds where untreated wastewater is a documented source of bacteria, basic repairs to the wastewater system can produce impressive local reductions in bacteria levels (Schueler, 1999). For example, several communities have measurably reduced bacteria levels by connecting homes with failing septic systems to sanitary sewer lines, rehabilitating ageing sanitary sewer lines, eliminating illicit/illegal connections, and providing pumpouts of recreational sewage.

Addresses Hotspots

Stormwater hotspots are areas that produce higher concentrations of pollutants than normally found in urban runoff. Addressing hotspots has been identified as a selection criterion because greater pollutant reductions can be achieved by implementing controls at these sites. Certain areas of the urban landscape are known to be hotspots of stormwater pollution. Examples of stormwater hotspots include gas stations, parking lots, and auto recycling facilities which can contribute 5 to 10 times higher concentrations of trace metals and hydrocarbons in stormwater runoff. Parks and golf courses can be hotspots for bacteria and nutrients from fertilizer applications. These hotspots merit special management and pollution prevention activities.

Targets Nutrients

Nutrient reduction has been identified as a BMP selection criterion because of the phosphorus reduction goals of the draft Snake River – Hells Canyon TMDL. Source controls that result in phosphorus reductions include components of the illicit discharge detection and elimination measure, public education activities, and certain types of structural BMPs that provide for phosphorus removal.

Temperature Control

BMPs for reduction of other pollutants should include practices that can result in localized temperature improvements such as revegetation of streambanks. Other methods to control the thermal enrichment of stormwater are becoming available, which can help reduce the impacts of urbanization on receiving waters.

Construction and post-construction BMPs that preserve or mimic the predevelopment hydrologic regime at urbanized sites are among the most promising techniques for controlling temperature.

Life Cycle Costs

The cost of a BMP should be weighed against its effectiveness. Consideration of costs includes both capitol costs and maintenance costs, if applicable. Maintenance costs should also be considered because proper maintenance plays a vital role in ensuring the proper operation of both structural and source controls. For example, reducing the frequency of inspections and cleanout of a structure may initially reduce program costs, but the effectiveness of the BMP can be diminished, which creates the need for additional controls and results in deterioration in water quality, which has a cost associated with it.

Site-Specific Suitability

Technical factors affect the site-specific suitability of particular BMPs, especially structural controls. These factors include land use, size of drainage area, soil permeability, slopes, depth to seasonal high water table, space requirements, depth to bedrock, pollutants to be addressed, the type and condition of water and maintenance access. These factors must be considered in identifying acceptable controls for discharges from new development.

Public Acceptability

The makeup and activities of the community is important for successful implementation of BMPs, which require significant community involvement to be effective. Factors to be considered include demographics, environmental and aesthetic issues, and business climate.

Multiple Application Advantage

Certain types of BMPs have an advantage because they offer a multiple use advantage that single use controls do not. Land use controls are an example of a BMP with multiple applications. It has an advantage over a single use control such as a detention pond because it has the potential to result in reductions over large areas. Another examples of a multiple use BMP is an education campaign that is targeted to the general public or a specific audience.

Existing Programs

Activities that can be implemented through existing programs have an advantage because of institutional acceptability and cost savings. Support is more likely to exist if the activity builds on existing capabilities or modifies existing programs or activities. Without institutional support, control measures are less likely to be implemented which will have a significant impact on the effectiveness of urban runoff control programs. Integrating new activities with existing programs is also one of the most cost-effective ways to achieve reductions in pollutant loadings.

Phase II Minimum Measures - Addressing Existing Discharges

Pollutant load reductions from existing activities can be achieved by the implementation of programs and activities associated with four of the six minimum measures required by the Phase II requirements. These measures include public education, public involvement, illicit connection detection and elimination, and pollution prevention/good housekeeping practices for municipal operations. The following discussion of the six minimum measures was adapted from EPA guidance materials (EPA, 2000).

Public Education and Outreach

The federal regulations require that a public education program be implemented to distribute educational materials to the community, or conduct equivalent outreach activities about the impacts of storm water discharges on local waterbodies and the steps that can be taken to reduce storm water pollution. Public education helps ensure success through greater support and greater compliance for the storm water program. The public education program should include initial public contact and education and milestones for involvement throughout the development and implementation phase.

Public education programs are expected to target specific audiences, including those regulated or affected by the program, such as developers, building contractors, and industrial operators, and those that can assist with program implementation (e.g. volunteers and citizens). It can also include other Phase II communities, groups or associations in the area willing to cooperate as partners.

Examples of public education and outreach activities include:

- A community-wide survey assessing homeowner storm water knowledge, attitudes, and practices, to gauge the level of knowledge in the area, and prioritize activities to meet local concerns
- Signs posted along roadways and in housing areas to identify the watershed, especially where its boundaries intersect streets and highways. This increases public awareness regarding activities occurring within the watershed and alerts emergency responders to notify the utility of any potentially harmful releases that occur within it.
- Newsletters or water bill inserts about the storm water program
- Local paper coverage of program-related meetings to keep the community informed on progress and issues or a series of short articles about storm water

- Brochures with guidelines for items such as pet waste cleanup, proper storage and disposal of household hazardous materials, lawn care and septic tank maintenance
- Community meetings, with invited state or local officials to explain why protecting storm water is important
- Alternative information sources, such as web sites, bumper stickers, refrigerator magnets, posters for bus stops and restaurant place mats
- Educational displays at home shows and community festivals
- Curriculums and activities for school-age children
- A volunteer monitoring program
- Water Awareness Week activities
- Recognizing community and volunteer efforts publicly
- A household hazardous waste collection day as an occasion for education on proper storage and use of chemicals.

Examples of measurable goals for this minimum measure are shown in Table 1.

Table 1. Public Education and Outreach Measurable Goals Example

Target	Activity
Year 1	3 brochures developed and distributed in water utility bills
Year 2	A web site created; school curricula developed; storm drains stenciled
Year 3	75% of public reached with storm water educational material
Year 4	Survey shows 20% increase in public awareness of storm water

Public Involvement

The storm water management program should include a public involvement component. Public participation will ensure broader public understanding and support, provide a broader base of expertise, and provide additional resources to the program through volunteer activities.

Generally, the public should be involved as early as possible in program development. In some cases the public involvement may simply be to receive information but it is also important to involve the public through advisory groups or public meetings when considering major policy issues in the development of the program.

At a minimum, the public participation component of the program must include compliance with applicable state and local public notice requirements, which includes public notice of new ordinances or ordinance revisions. The Open Meeting Law (Idaho Code Title 67, Chapter 23) sets forth requirements for public notification of meetings.

Examples of public involvement activities include:

- Public meetings/citizen panels to provide input concerning new policies and programs
- Volunteer water quality monitoring
- Volunteer educators/speakers who can conduct workshop, encourage public participation, and staff special events
- Storm drain stenciling by volunteers
- Community clean-ups along waterways and around storm drains
- Citizen watch group to assist in identification of polluters

Examples of measurable goals for this minimum measure are shown in Table 2.

Table 2. Public Participation Measurable Goals Example

Target	Activity
Year 1	Notice of public meeting in different print media and bilingual flyers; local storm water advisory group established
Year 2	Final recommendations of advisory group; radio spots promoting program and participation
Year 3	Three stream clean-up days held every year
Year 4	Volunteer monitoring results published

Illicit Discharge Detection and Elimination

Illicit discharges enter the storm water system through either direct connections (e.g. wastewater piping either mistakenly or deliberately connected to the storm drains) or indirect connections (e.g. paint or used oil dumped directly into a drain). Sources of illicit discharges include such things as sanitary wastewater, effluent from septic tanks, car wash wastewaters, improper oil disposal, radiator flushing disposal, sump pump discharges, laundry wastewaters, and improper disposal of household chemicals.

Storm water management plans must include an illicit discharge detection and elimination program which includes:

- A storm sewer system map, showing the location of all outfalls and the names and locations of receiving waters;
- An ordinance, or other regulatory mechanism which prohibits or regulates non-storm water discharges into the MS4;
- A plan to detect and address non-storm water discharges, including illegal dumping into the MS4; and
- Education of public employees, businesses, and the general public about the hazards associated with illegal discharges and the improper disposal of waste.

It is important to understand how storm water runoff is currently managed in order to target efforts efficiently. This requires an assessment of the storm water system. Maps, inventories, or other assessments of the physical infrastructure in place should be identified. If these do not exist or are incomplete, an assessment should be done. An assessment should provide an inventory of storm water inlets, pipes, ditches, and open channels; identify outfalls and where they are located; determine if someone else is discharging storm water into the system; identify major pollutant sources (industrial, commercial, residential); and identify what types of flood control or water quality practices are currently in place.

A plan should then be developed to detect and address illicit discharges, based on available resources, and the degree and character of the illicit discharges. The plan should identify steps that will be taken to locate problem areas, finding the source of the problem, removing the connection or correcting the discharge.

Education efforts and working with the discharger can be effective in resolving the problem before taking legal action. This should be part of a broader educational effort to detect and eliminate illicit discharges that should include:

- Providing training programs for public employees;
- Developing informative brochures, and guidance for specific audiences;
- Designing a program to publicize and facilitate public reporting of illicit discharges;
- Coordinating volunteers for locating, and visually inspecting, outfalls or to stencil storm drains; and
- Initiating a recycling program for commonly dumped wastes, such as motor oil.

Examples of measurable goals for this minimum measure are shown in Table 3.

Table 3. Illicit Discharge Measurable Goals Example

Target	Activity
Year 1	Outfall locations mapped; recycling program for household hazardous waste in place
Year 2	Ordinance in place; training for public employees completed
Year 3	50% of priority areas have been screened for illicit discharges; households participating in household hazardous waste collection days
Year 4	All identified illicit connections have been fixed

Pollution Prevention/Good Housekeeping for Municipal Operations

Stakeholders must develop and implement an operation and maintenance program to prevent or reduce pollutant runoff from municipal operations into the MS4, including employee training.

The following components should be considered for this measure:

- Maintenance activities, maintenance schedules, and long-term inspection procedures
- Control for reducing or eliminating the discharge of pollutants from areas such as roads and parking lots, maintenance and storage yards, and waste transfer stations
- Procedures for the proper disposal of waste removed by maintenance activities
- Ways to ensure that new flood management projects assess the impacts on water quality

Stakeholders should develop a schedule of regular maintenance of structural controls and infrastructure (e.g., removing sediment from retention ponds every five years, cleaning catch basins annually, removal of litter from channels twice a year) as part of a storm water management program. Maintenance logs can be used to track activities and develop a matrix of tasks on a timeline, such as inspection, repair, replacement, and cleanout.

When regularly scheduled maintenance is not appropriate, periodic inspections can be used to determine when maintenance is needed. If maintenance is to be based on the results of inspections or if maintenance is scheduled infrequently, an inspection schedule should be provided. Because maintenance issues are critical to successful program implementation, measurable goals for maintenance should be considered throughout the term of the permit.

Retrofitting should also be considered as an opportunity to improve existing structural controls. Retrofitting is a process that involves the modification of existing surface water runoff control structures or conveyance systems that were designed to control flooding, so they will also serve a water quality improvement function.

An evaluation of major existing public structural controls and municipally owned sites and rights-of-way should be conducted to identify where retrofits or new controls can be installed. An inventory will identify where additional reductions of pollutants can be achieved using current and potential storm water quality and quantity controls and will facilitate both long- and short-term storm water master planning.

Examples of measurable goals for this minimum measure are shown in Table 4.

Table 4. Municipal Operations Measurable Goals Example

Target	Activity
Year 1	Pollution prevention plan completed; employee training materials developed; procedures in place for catch basin cleaning and street sweeping
Year 2	Training for appropriate employees completed; recycling program fully implemented
Year 3	Pollution prevention BMPs incorporated into master plan; 30% reduction in pesticide and sand/salt use; maintenance schedule for BMPs established
Year 4	30% reduction in floatables discharged; 80% compliance with BMP maintenance schedules; controls in place in all areas of concern

Phase II Minimum Measures - Preventing Future Discharges

Construction site discharge control and post-construction storm water management comprise the other two minimum measures required under the Phase II rule. These measures are necessary to prevent additional future loads to the Boise River and its tributaries in areas undergoing new development or redevelopment. Pollutant loads above current discharges can be prevented by implementation of activities that control runoff from new development. This includes control of discharges from building sites during construction and following construction. Additional pollutant reductions may be achieved when land conversion is from a high load situation (e g. irrigated agriculture) when additional BMPs are implemented.

Opportunities for achieving pollutant reductions can be incorporated into the site plan review and land use planning processes. Water-related codes and ordinances, such as erosion and sediment controls, storm water management, and prevention of illicit connections, can be implemented through the site planning process and verified through the review process.

Storm water management can be achieved by relying on existing land development requirements, strengthening or developing new storm water codes and ordinances, and using the site plan review process to ensure that appropriate storm water codes and ordinances are implemented. The site plan review process is typically the final stage of municipal review that occurs before development takes place.

Land use planning is an additional process that precedes (but does not replace) the site plan review process. The planning process typically involves the setting of land use goals and objectives for various parts of a municipality into a plan document or onto a plan map. Water quality can be addressed by incorporation of policies regarding storm water quality into the land use.

Construction Site Discharge Control

The construction site discharge control measure is intended to control all pollutants commonly discharged from construction sites. The Phase II Rule requires entities to develop, implement, and enforce a program to reduce pollutants from construction activities that result in a land disturbance of *greater than or equal to one acre*. Generally, sediment in runoff or as fugitive dust is the main pollutant of concern. Consequently, this is an important measure for achieving the sediment load reductions required by the TMDL. In addition to sediment, construction sites can generate many other pollutants such as pesticides, oil and grease, concrete truck washout, construction chemicals, construction debris, solvents, paints, sanding dusts, and fertilizers.

Required activities include:

- An ordinance or other regulatory mechanism requiring the implementation of proper erosion and sediment controls, and controls for other wastes, on applicable construction sites;
- Procedures for site plan review that consider potential water quality impacts;
- Procedures for site inspection and enforcement of control measures;
- Sanctions to ensure compliance established in the ordinance or other regulatory mechanism; and
- Procedures for the receipt and consideration of information submitted by the public.

In addition, the federal storm water regulations require NPDES Permits, issued by EPA, for construction sites greater than five acres. A Storm Water Pollution Prevention Plan must be prepared and implemented to control storm water discharges from the construction site. Under Phase II, this requirement will extend to all construction sites greater than one acre. This requirement applies to all construction sites that meet the size threshold regardless of whether the construction occurs within the jurisdiction of a municipality regulated under Phase I or Phase II of the federal storm water requirements. This requirement is in addition to the construction site controls that are implemented by Phase I and Phase II regulated municipalities.

Construction site BMPs can be categorized as erosion control practices, which prevent or minimize erosion; sediment control practices, which attempt to capture soil released through erosion; and source controls.

Erosion control represents various practices designed to keep water from coming in contact with bare soil or controlling its velocity if it does. Preventive erosion controls include limiting disturbance to land and vegetation; scheduling; and phasing construction. Phasing construction is a practice in which clearing operations are performed in stages to take advantage of cover that exists on the site before construction.

Temporary cover practices are used on portions of construction sites that remain unworked for months, during which time very large amounts of erosion can occur unless these areas are stabilized. Stabilization can be achieved with temporary seeding or various kinds of slope coverings, or both. Slope coverings include both mulches and commercial mats and blankets. Fugitive dust can be controlled through these practices or through the application of water or tackifiers.

Other stabilization practices include a stabilized construction entrance and permanent stabilization through vegetation establishment as soon as possible after all construction is completed in each segment of the site. The construction entrance at the most important access route is important to stabilize, since it is the last point at which tracking sediment off site can be stopped. If equipment travels extensively on unstabilized roads on the site, a tire and vehicle undercarriage wash near the entrance will be needed. Wash water will require treatment in a sediment pond or trap.

Erosion control practices Include drains for surface and subsurface water, dikes and swales placed across slopes to interrupt runoff, and roughness created on the surface to reduce velocity.

Trapping sediments once they are released requires slowing the transport velocity sufficiently for soil particles to settle (i.e., reducing the velocity below the settling velocity of the particles). The two basic types of sediment trapping techniques in use are sediment barriers and settling ponds. Sediment barriers include the commonly used filter fabric and straw bale fences as well as brush fences and barriers constructed of gravel. Both types trap sediments in the same way, by ponding water.

Source controls are used in the management of other construction site pollutants. Construction sites can create pollution problems over and above erosion and sediments through paving operations, handling and storage of various materials, spills, and waste handling. Examples of measurable goals for this minimum measure are shown in Table 5.

Table 5. Construction Site Runoff Control Measurable Goals Example

Target	Activity
Year 1	Ordinance or other regulatory mechanism in place; procedures for information submitted by the public in place
Year 2	Procedures for site inspections implemented; educational program for construction operators in place
Year 3	75% of local construction operators trained
Year 4	90+% of sites complying with local ordinance

Post Construction Storm Water Management

Post-construction storm water management in areas undergoing new development or redevelopment is necessary to prevent additional future loads to the Boise River and its tributaries and may result in reductions when BMPs are applied. The Phase II Rule includes a requirement to develop, implement, and enforce a program to reduce pollutants in post-construction runoff to the MS4 from new development and redevelopment projects that result in the land disturbance of *greater than or equal to 1 acre* that includes:

- Strategies which include a combination of structural and/or no-structural BMPs;
- An ordinance or other regulatory mechanism requiring the implementation of post-construction runoff controls; and
- A strategy to ensure adequate long-term operation and maintenance of controls

Structural and non-structural BMPs could be used to satisfy the requirements of this measure. Structural controls include infiltration devices, detention and retention basins, vegetated swales, water quality inlets, screens and filters, channel stabilization, riparian habitat enhancement efforts, and wetland restoration projects.

Non-structural controls include planning, procedures, and site-based local controls. Runoff problems can be addressed efficiently with sound planning procedures. Master plans, comprehensive plans, and zoning ordinances can promote improved water quality by guiding the growth of a community away from sensitive areas and by restricting certain types of growth to areas that can support it without compromising water quality. Site-based local controls can include buffer strip and riparian zone preservation, minimization of disturbance and imperviousness, and maximization of open space.

Many communities already require that developers maintain post-construction runoff to pre-construction levels through the use of structural controls. A water quality component can be added to these requirements to ensure that off-site discharges have received pretreatment and that infiltration facilities are appropriately sited to prevent untreated storm water from being injected into the shallow aquifer and contaminating ground water.

Redevelopment projects also offer the opportunity to improve existing storm water management practices. Existing practices may be inadequate or performing poorly, or they may simply lack the pollutant removal capability of newer BMP designs. The least expensive and most practicable retrofit opportunities often involve the improvement of existing urban BMPs. Examples of measurable goals for this minimum measure are shown in Table 6.

Table 6. Post-Construction Measurable Goals Example

Target	Activity
Year 1	Strategies developed that include structural and/or nonstructural BMPs
Year 2	Strategies codified by use of ordinance or other regulatory mechanism
Year 3	Reduced percent of new impervious surfaces associated with new development projects
Year 4	Improved clarity and reduced sedimentation of local waterbodies

VI. Establishing Watershed Priorities

Because the resources to achieve the TMDL reductions are limited, there is a need to prioritize activities and subwatersheds for implementation of additional BMPs to achieve pollutant reductions beyond those that result from existing activities; pollutant reductions associated with land conversion, and Phase II activities.

In this section, priority subbasins are recommended for additional pollutant control activities where it is most likely that the greatest load reductions can be achieved. This approach could be used by state agencies to establish funding priorities or by a stakeholder for setting priorities for areas within its boundaries.

The prioritization approach is qualitative and is based on a consideration of subbasin location, existing pollutant loads, and growth patterns. When evaluating specific project proposals, subbasin characteristics should also be considered because such factors as land ownership, physical characteristics, or jurisdiction may play a role in the effectiveness of efforts to reduce pollutant loads. Subbasin characteristics were not used in this exercise of identifying subbasin priorities because of the site-specific nature of this type of information.

Subbasin location refers to the location of the subwatershed within the Lower Boise River watershed (distance down valley). Water is used several times as it moves down irrigation conveyance and drainage facilities in the Boise Valley. As water is used and reused, dissolved and suspended constituents increase to levels greater than those found at diversion sites located primarily in the reach between Lucky Peak Dam and the City of Boise (Reclamation 2001). A Bureau of Reclamation study found that there is a significant correlation between distance down valley and specific water quality parameters measured in storm runoff (2001).

The relative magnitude of existing pollutant loads and load reductions must also be considered in establishing subbasin priorities. Tables 7 and 8 display information regarding loads, load allocations and load reductions for subbasins in the Lower Boise River watershed. Table 7 lists the sediment loads and load allocation by subbasin. Those subbasins with the largest loads have been highlighted.

Table 7. Sediment Loads and Load Allocation by Subbasin

Subbasin	1995 Load (tons/day)	Load Allocation (tons/day)
Boise River @ Middleton	4.40	4.40 (see Note)
Conway Gulch	11.34	7.14
Dixie Slough	41.12	25.91
Fifteen Mile Creek	28.6	18.02
Hartley Gulch	8.43	5.31
Indian Creek	9.11	5.74
Mason Creek	34.1	21.48
Mill Slough	11.24	7.08
Willow Creek	3.62	2.28

NOTE: Using the mass balance approach, analysis showed that total suspended sediment targets were met upstream from Middleton. Thus, three contributing areas (the Riparian Area #1, Eagle Drain, and Thurman Drain) upstream from Middleton were assigned sediment loads equal to the 1995 loads used to develop the TMDL.

Table 8 displays the bacteria concentrations and percent reduction needed to meet the TMDL target. The subbasins with the highest means have been highlighted. Although the new state water quality standards for *E. coli* affect these target reductions, the subbasins with the highest percent reduction needed for fecal coliform colonies are very likely to be the same subbasins in which the highest percent reduction is necessary for *E. coli*. This will be confirmed with monitoring data that are currently being collected.

Table 8. Fecal Coliform Bacteria Concentrations and Percent Reduction

Subbasin	Primary contact geometric mean (CFU/100 ml)	Percent Reduction needed to meet 50 CFU/100 ml
Boise River@ Middleton	208	
Conway Gulch	723	93
Dixie Slough	2987	98
Fifteen Mile Creek	992	95
Hartley Gulch	2296	98
Indian Creek	770	94
Mason Creek	1407	97
Mill Slough	1282	96
Willow Creek	803	94

NOTE: Since the TMDL was developed, *E. coli* has replaced fecal coliform as the state water quality standard (126 *E. coli*/100 ml). Thus, compliance with the lower Boise River bacteria TMDL will be evaluated using the applicable *E. coli* state water quality standards to maintain the intent of the TMDL (to protect human health using the applicable standard).

Areas of projected growth are an important consideration in developing priorities for pollutant reduction activities primarily related to construction and post-development controls, because it is easier and most cost-effective to implement BMPs, both structural and nonstructural, before development has occurred. There is also greater potential for widespread application of development and post-development stormwater BMPs in the subbasins where future development is most likely to occur.

Information generated by the Treasure Valley Futures (TVF) Project was used to understand development trends. The TVF project looked at how transportation and land use planning interact to understand the consequences of growth as it is expected to occur over the next 20 years. The TVF project examined land use consumption trends and their relationship to household growth in order to characterize future growth pressures. The study found that new housing built between 1994 and 2000 is built at average lower densities than the existing housing stock, and that rural area and small cities are driving this rapid regional land consumption. The TVF report states that rural residential development is expected to be the main driver in the conversion of agricultural lands to residential uses over the next two decades with a little more than 5 % or 21,000 of the current agricultural acreage in the region likely utilized by 2020.

In evaluating land supply, the study found that the region's four large cities: Boise, Meridian, Nampa and Caldwell still contain considerable land supply for future growth, almost 55,000 acres. Of the existing land currently available for growth, 88% or almost 461,000 acres is in rural areas. Small cities in the Treasure Valley contribute relatively little additional land capacity, with only roughly 10,000 acres of land suitable for development among them.

Several growth scenarios concerning growth in the Treasure Valley by the year 2020 were also analyzed. They are presented in the "Treasure Valley Growth Scenario Analysis" (2002) and summarized below.

- Scenario 1 is based on the COMPASS 2020 Ada/Canyon Transportation Model, which assigns growth projection to subareas within the Valley called traffic analysis zones (TAZs).

- Scenario 2, called the TVF scenario, shows where future development would occur in the Treasure Valley by 2020 if the growth patterns from 1994 through 2000 were to continue for the next 20 years. Key factors included available land supply, the presence of existing similar development, and transportation accessibility.

- Scenario 3 is based on land use policies/objectives in each community's comprehensive plan based on allowable development densities and shows the total amount of future development that is permitted within the current public policy framework, but with no timeframe.

While the TVF study found that the total number of additional housing units is the same under both the COMPASS scenario and the TVF scenario, the increase is allocated differently among the places in the region. According to the COMPASS projection, future residential growth will be heavily concentrated in more urbanized parts of the Valley, with 82 percent of the increase in metropolitan areas. The TVF scenario shows more intensive growth in rural areas of the region, with more than twice the amount of additional housing units in rural areas than in the COMPASS scenario. Table 9 shows the difference between the TVF and COMPASS scenarios.

Table 9. TVF and COMPASS Shifts in Distribution of Regional Housing Stock, 2000-2020 (TVF Project, 2002)

City/Area	2000 Baseline		2020 TVF			2020 COMPASS		
	Housing Units	Percent of Total	Housing Units	Percent of Total	2000-2020 Increase	Housing Units	Percent of Total	2000-2020 Increase
Metro	136,985	84.2%	183,493	76.5%	34.0%	199.967	83.4%	46.0%
Small Cities	8,594	5.3%	13,832	5.8%	60.9%	10,160	4.2%	18.2%
Rural	17,051	10.5%	42,519	17.7%	149.4%	29.717	12.4%	74.3%
Treasure Valley	162,630	100.0%	239,844	100.0%	47.5%	239,844	100.0%	47.5%

In Ada County, the metropolitan areas are Boise, Garden City, and Meridian, as are Caldwell and Nampa in Canyon County. Eagle, Kuna, Star and Middleton represent the small cities. The magnitude and spatial distribution of the anticipated future expansion is displayed in Table 10, according to the residential density classes.

Table 10. TVF Regional Housing Stock Increase by Place Type and Density, 2000-2020 (TVF Project, 2002)

Place Type	2000-2020 Housing Units Increase			
	Rural	Suburban	Urban	Total
Metro	3,231 6.9%	33,391 71.8%	9,884 21.3%	46,506 100,00%
Small Cities	861 16.4%	3,400 64.9%	979 18.7%	5,240 100.00%
Rural	7,987 31.4%	14,865 58.4%	2,616 10.3%	25,468 100.00%
Total	12,079 15.6%	51,656 66.9%	13,479 17.5%	77,214 100.00%

Residential Density Assumptions: Rural - 2.46 Acres/Dwelling Unit (DU), Suburban – 0.24 Acres/DU, Urban - 0.08 Acres/DU

The majority of total housing units in the region in 2000 were built at suburban densities and this type of housing account for almost two-thirds of the region's total housing stock. The majority of residential growth is projected to continue at suburban densities.

The location of the 2020 TVF projections and the 2020 COMPASS growth projections are shown on the following maps. Subbasin boundaries have also been included on these maps.

The maps physically illustrate the TVF and COMPASS projects for 2020. For the purposes of this Plan, subbasins have been delineated on the maps and include the Boise River corridor, Conway Gulch, Dixie Slough, Dry Creek, Five Mile Creek and Ten Mile Creek, Hartley Gulch, Indian Creek, Lake Lowell, Mason Creek, Mill Slough, Sand Hollow Creek, and Willow Creek.

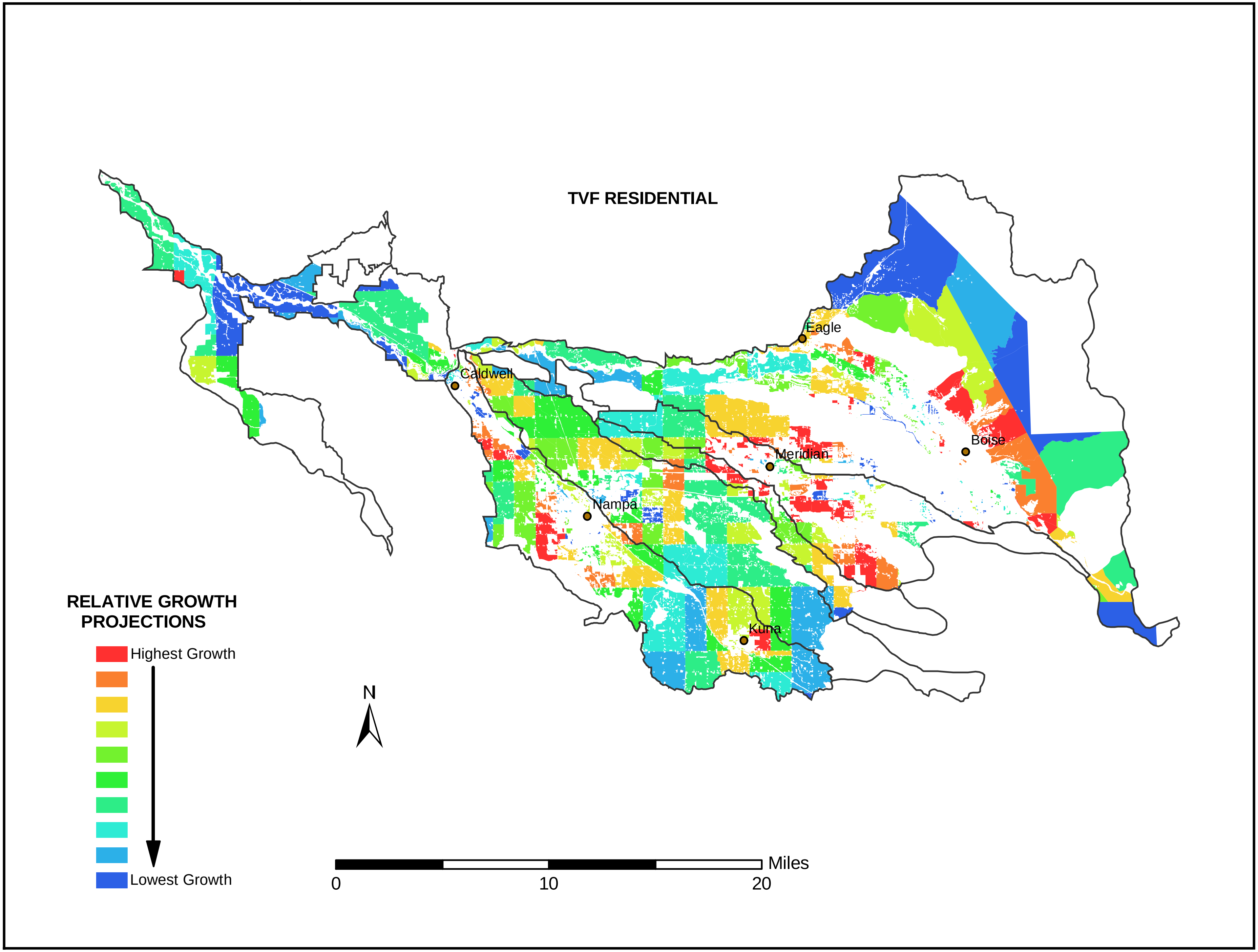
The Sand Hollow subbasin discharges directly to the Snake River and separate TMDLs will be prepared for the Lake Lowell, Upper Indian, Upper Five Mile and Upper Ten Mile subbasins. However, these subbasins have been included in order to present a holistic view of the subbasins that comprise the Lower Boise River watershed, to assist stakeholders and regulatory agencies with responsibilities in these areas in understanding the larger picture

With an understanding of the projected development pattern, local jurisdictions can target efforts related to storm water program priority areas and agricultural interests can avoid investment in agriculture BMPs in areas likely to be developed in the short term since these expenditures will have limited future payoffs.

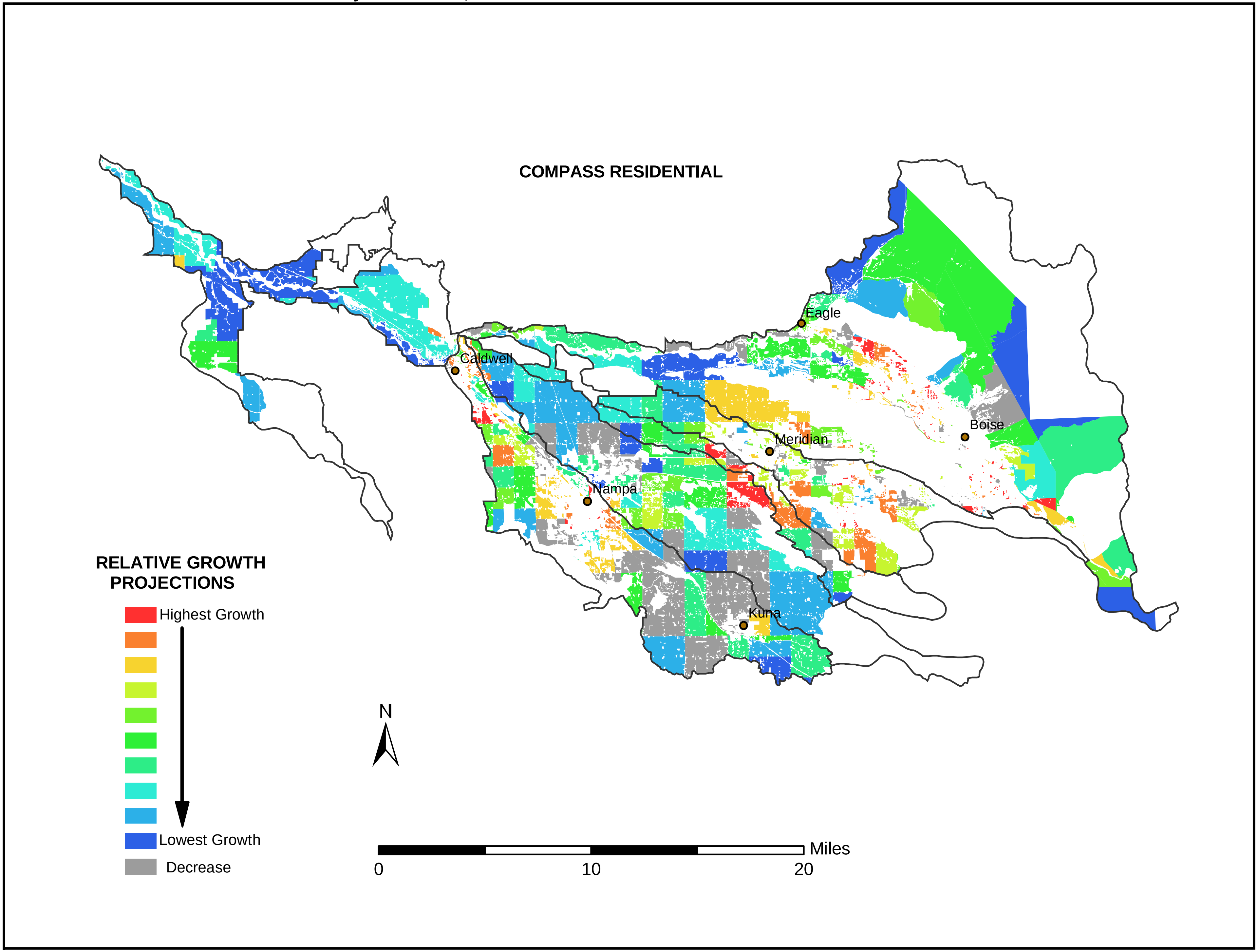
Most importantly, jurisdictions that must deal with the expected growth in the coming years have the opportunity to modify existing development policies and regulations to address stormwater runoff and associated loads and realize a net pollutant load reduction as the land use is converted from agriculture to urban/suburban. This net decrease will only occur if adequate controls are in place prior to development.

The Boise River corridor, Lower Five Mile Creek, Lower Indian Creek, Lower Ten Mile Creek and Mason Creek best meet the criteria conditions of location, loads and growth. All of these subbasins discharge into the lower portions of the Boise River, except for the upper end of the Lower Boise corridor. Mason Creek and Fifteen Mile Creek (which is formed by Five and Ten Mile Creeks) had among the largest sediment loads (1995 loads in tons/day). Mason Creek also had among the highest bacteria concentrations.

MAP 1: TVF Residential Growth Projections 2020, SCS Subwatersheds in Boise River Watershed



MAP 2: COMPASS Residential Growth Projections 2020, SCS Subwatersheds in Boise River Watershed



Although sediment loads from the Dixie Slough subbasin were higher, urban/suburban land uses are more limited and the projected growth potential is low in this area. Similarly, the highest bacteria concentrations are found in the Dixie Slough and Hartley Gulch subbasins, which also has fewer urban/suburban activities. On the other hand, the application of long-term agricultural BMPs in these areas, Dixie Slough and Hartley Gulch, would not be limited by the likelihood of development of these agricultural lands.

The Lower Boise corridor, Mason Creek and the lower portions of Five Mile, Ten Mile and Indian Creek; should be considered priority areas for the implementation of activities beyond the requirements of Phase II because they provide opportunities to achieve the largest pollutant reductions associated with land use conversion and the largest benefit for the resources invested relative to other areas.

VII. Partnerships

The effectiveness of pollutant reductions from urban and suburban sources can be enhanced by partnerships among the stakeholders at the local and/or regional level. Partnerships are a key to effective watershed management and often result in:

- More efficient use of financial resources,
- A spirit of sharing and cooperation,
- Fairness which minimizes the potential for negative social and economic impacts, and
- More creative and acceptable ways to protect water quality

Stakeholders should consider local partnerships with other affected entities in their area. Stakeholders could share information through regular meetings and, if goals are compatible, partner to share resources or join as co-permittees. The NPDES storm water permit issued for the Boise area is based on such a partnership. Boise City, ACHD, Garden City, Boise State University, the Idaho Transportation Department, and Ada County Drainage District 3 are partners in the implementation of activities required by permit conditions. Co-permittees implement activities specific to their jurisdiction while activities that affect all permittees, such as education and enforcement are accomplished cooperatively through an intergovernmental agreement.

At the regional level, a partnership would promote regional consistency and facilitate efficient use of public resources. Stakeholders could focus on regional challenges and opportunities to improving the quality of storm water runoff. A partnership would encourage information sharing and cooperation, and could develop products and programs that would be more cost-effective done regionally than could be accomplished locally. A partnership could provide a range of options for participation, and would allow local governments to pool their resources, to produce higher quality products, and in some cases, to do things they cannot do separately.

This association could evolve from an organization that promotes talking to each other, to one that shares information and resources, to one that does things together, and finally to an organization that does things with agencies and organizations outside of itself.

Partnerships also enable a watershed approach to permit issuance and program implementation to occur more easily. A watershed approach allows for coordinated (and hence most cost-efficient) monitoring for effluent and receiving waters.

VIII. Plan Implementation Schedule

Plan implementation is based on a schedule related to the proposed timeframes associated with the Phase II storm water requirements. The schedule is displayed in Table 10, and is based on the assumption that TMDL compliance and reporting activities will coincide with Phase II permit requirements to facilitate the development of storm water management programs that integrate and achieve the requirements of both simultaneously. Existing activities are ongoing and are displayed as such in this table. While a consideration of pollutant load reduction associated with land use conversion is considered in the strategy of this Plan, it is not displayed as a separate implementation activity. Control activities associated with new development are part of ongoing programs and new programs required by Phase II that are included in the schedule.

Activities and milestones, identified in the Table, will occur over a 5-year time period, beginning in 2003. Load reductions required to meet TMDL requirements will be achieved over a ten-year time period with activities to meet the Phase II six minimum measures phased in over the first five years. Additional activities beyond existing programs and Phase II activities may be needed in priority subbasins.

Milestones identified in Table 10 are based on the assumption of full implementation in the first five years with mid-course corrections to programs and activities based on annual evaluations of the progress made towards the measurable goals identified in each jurisdictions storm water management plan. This approach is consistent with the adaptive management strategy presented in the overall Lower Boise River TMDL Implementation Plan.

It should be recognized that Boise area storm water NPDES permittees have been implementing programs and activities for improving storm water runoff quality for several years. The first year of their 5-year NPDES permit began November 29, 2000. Annually, and at the end of each five-year permit period, permittees evaluate programs and activities and make adjustments as needed.

IX. Implementation Costs and Potential Sources of Funding

Funding is needed to implement a storm water management program, and to maintain the staff, equipment and materials. The U.S. EPA developed detailed cost estimates for the Phase II requirements (Table 11). Implementation of the six minimum measures was projected to represent the primary cost components.

In the final regulations, EPA estimated the cost of compliance based on a fixed cost component and a variable cost component. The fixed cost component included costs for the municipal application, record keeping, and reporting activities. On average, EPA estimated annual costs of $1,525 per municipality. Variable costs include the costs associated with annual operations for the sic minimum measures and are calculates at a rate of $8.93 annually per household (assuming 2.62 persons per household.) Thus the cost estimating equation is:

$$\text{Annual} = \$1{,}525 + \text{population}/2.62 * \$8.93$$

Reese (Table 12) further refined these estimates for two hypothetical permittees. Permittee one (“Smallville”) is a community of 10,000 that is adjacent to a larger city that has obtained a Phase I permit or that can assist Smallville in many of its permit responsibilities. Permittee two (“Midtown”) is a larger community with a population of 50,000 located within an urbanizing county whose total population makes it a designated “urbanized area.”

Table 10. Phase II Permittee Plan Implementation Schedule

Activity/Milestone	Year 1		Year 2[1]		Year 3		Year 4		Year 5		Year 6	
Continued implementation of existing programs												
Stakeholders assess systems, existing authorities and programs												
Stakeholders form local and/or regional partnerships												
Storm water management plans prepared. Plan approval by local decision makers. Phase II NPDES permit application submitted (if applicable)												
Local advisory groups established.												
Public education developed.												
Storm water systems mapped.												
Storm water authorities in place.												
Priority subbasins assessed for additional load reduction opportunities												
Structural controls for development in place.												
O&M plans for public facilities in place.												
Initiate planning and implementation of additional pollutant reduction activities in subbasins.												
Construction site controls in place.												
Nonstructural controls for development enacted.												
All illicit connections fixed.												
Submittal of Annual Reports	Same date each year (determined by NPDES Permit)											

[1]Year 2 is assumed to be year 1 of the Phase II NPDES permit

Table 11. Per Capita Costs for Six Minimum Measures (US EPA, 1999)

Measure	Low End of Per Capita Costs ($ per capita)	High End of Per Capita Costs ($ per capita)
Public Education	$0.02	$0.34
Public Involvement	$0.19	$0.20
Illicit Discharges	$0.02	$2.61
Construction Sites	$0.04	$1.59
Post Construction	$1.09	$1.09
Municipal Operations	$0.01	$2.00
Total	$1.37	$7.73

Table 12. Estimated Costs for Two Municipalities of Differing Size (Reese, 2000)

	Annual Per-Capita Cost	
Minimum Control	Smallville	Midtown
Public Education	0.39	1.24
Public Involvement	0.21	0.62
Illicit Connections	0.24	1.77
Construction	0.20	0.96
Post Construction	0.14	5.78
Municipal Operations	0.15	0.59
Total	1.33	10.96

There is site-specific variability in the selection of appropriate BMPs, as well as in the design constraints and pollution control effectiveness of practices. Moreover, some stakeholders may already be meeting the minimum measures, or only one or two practices may need to be added to achieve the measures. The estimates in Tables 11 and 12 represent costs to local government and do not include additional costs that will be passed on to contractors, developers and other entities that will be regulated by Phase II entities.

EPA also considered cost effectiveness, which they defined as the incremental annualized cost of a pollution control option per incremental pound of pollutant removed annually by the control option (US EPA, 1999a). Only potential reductions in TSS loadings were quantified, although EPA anticipated that reductions in oil and grease, nitrogen, phosphorus, pathogens, lead, copper, zinc, and other metals would also result. EPA compared the potential costs per pound of TSS removed from Phase II municipalities to the costs estimated for publicly owned treatment works (POTW) to remove this same pollutants. For municipalities, costs were expected to range from $0.04 to $0.18 per pound of TSS removed compared to $0.70 per pound of TSS removed for POTWs (Ibid.).

The objective of the Phase II Stormwater requirements is to control the whole array of potential pollutants in storm water discharges to protect water quality. This Plan includes activities that meet that objective, but emphasizes the pollutants of concern addressed by the Lower Boise River TMDL: sediment and bacteria. For the purpose of the TMDL, the most effective activities are those that target sources of sediment (streambank erosion, construction sites, and the wash off from paved surfaces) and sources of bacteria (sanitary sewer leaks, leaking septic systems, illicit discharge of sewage, and contributions from pets and wild animals). In the interest of controlling new sources, new development must also be considered.

EPA developed an analysis of potential costs to the construction and land development sector from post-construction runoff control measures in municipal measures (Table 13). Although a mix of planning, site design, and structural approaches can be used for post construction runoff control, the cost analysis focused on structural controls (installation and maintenance of structural BMPs).

Table 13. Summary of Per-Site Average Total BMP Costs by Acreage and by Percent Imperviousness in 1998 dollars (US EPA, 1999a)

Area (Acreage)	35% Impervious (Multi-Family Residential)	65% Impervious (Multi-Family/Commercial)	85% Impervious (Commercial)
1 Acre	$2,277	$4,867	$10,192
3 Acres	$5,172	$12,068	$15,260
5 Acres	$8,760	$14,389	$17,497
7 Acres	$15,865	$29,248	$68,996

Average per-site costs can be multiplied by the number of construction starts for each category to determine projected post-construction runoff control costs. Cost savings can be achieved through an array of other structural and non-structural options for post-construction control. These options include:

- Improved site/construction design that minimizes impervious areas or redirects runoff to grassy surfaces
- Site-based local controls, such as buffer strips and riparian zone preservation
- Other municipal regulatory approaches, such as reduced parking requirements for commercial facilities and changes to zoning and comprehensive plans.

The implementation of other sediment and bacteria control practices is more site specific making cost estimates more difficult. Costs for vegetative stabilization for shorelines and streambanks can include costs for wetland plants and riparian area vegetation, including trees and shrubs. Additional costs could be incurred depending on the level of site preparation that is required. The items of work could include (1) clearing the site of fallen trees and debris; (2) extensive site work requiring heavy construction equipment; (3) application of seed stock or sprigging of nursery-reared plants; (4) application of fertilizer (most typically for marsh creation); and (5) post project maintenance and monitoring.

Costs for structural stabilization typically include costs for survey and design and for extensive site work, including costs to gain access for trucks and front-end loaders necessary to place the stone (for revetments) or sheet pile (for bulkheads). Costs frequently vary depending on the level of wave exposure at the site and on the overall length of shoreline or streambank that is being protected in a single project.

Street and parking lot sweeping and catch basin cleaning costs have been estimated to be $65/curb mile, excluding disposal costs, and $10-$40/catch basin (Rouge Program Office, 1997). The cost of pet waste collection programs will vary depending on the intensity of the effort and the paths chosen to control pet waste. The most popular way is through an ordinance, but managers must consider the cost of enforcement, including staff and equipment requirements. The type of materials produced and the method of distribution selected determine public education program costs. Signs in parks may initially have a higher cost than printed materials, but can last for many years. Signs may also be more effective because they act as on-site reminders to dog owners to clean up in parks.

Funding Options

Funding is needed to maintain the staff, equipment and materials necessary to develop and implement an effective program. Some alternative funding options include:

Debt Financing: Revenue bonds or bonds that rely on ongoing sources of revenue may be used. Alternatively, a general obligation bond can be issued which are backed by the full faith and credit of your municipality.

Grants and Loans: Federal or state grant or loan funds may be available for some elements of the storm water program, depending on the BMPs selected. Grants and loans are usually applicable to specific projects and not on-going activities, such as operation and maintenance.

Users/Utility Fees: Utility services charges are rates billed to customers for providing storm water management services. The service charges may be flat rates, or variable rates based on classes of customers. Utility service charges may represent a dedicated source of funding and an ongoing method of funding some or all storm water management programs.

Special Assessment: Properties can be assessed annually to fund storm water management programs. Often, special assessments are used to fund a special district or authority that can implement

	all or portions of a region's storm water management program.
General Fund:	General fund monies are used for many storm water programs. If storm water programs are funded from your General Fund, the programs are at risk in each budget cycle.
Inspection Fees:	Plan review and inspection fees allow the community to recover some or all of the direct cost associated with performing design reviews for pre- and post-construction BMPs.
Developer Fees:	The developers construct needed facilities as a condition of development and bear associated costs.
Alternative Fees:	Instead of constructing on-site facilities to meet development requirements, developers may be given the option of paying a comparable fee to be used by the local government to build regional facilities that are designed to meet the same objectives as the developer-constructed on-site mitigation.
Connection Fees:	A one-time charge assessed at the time of development to recover a proportionate share of the cost of existing facilities and planned future facilities.

X. Mechanisms for Ensuring Achievement of Phase II Plan Goal

There are three mechanisms that will be used to ensure that Phase II stakeholders reduce pollutant loads from urban and suburban sources by implementing activities identified in this plan: permitting agency oversight, built in milestones or measurable goals, and regulatory oversight by IDEQ and EPA.

NPDES storm water permit compliance depends on stakeholder responsibility, with oversight by EPA. EPA employs inspections, record reviews, and annual reports to monitor compliance with its environmental regulations although regulated entities have the primary responsibility for ensuring that they are in continuous compliance through self-audit and self-disclosure.

Regulated communities must conduct periodic evaluations and assessments of their storm water management practices, maintain records and prepare required reports. Regulated communities under Phase II must:

- Evaluate program compliance
- Evaluate the appropriateness of the identified BMPs
- Evaluate progress toward achieving measurable goals
- Keep records required for at least three (3) years
- Submit the records when requested by EPA

- Make the records and storm water management plan accessible to the public

Regulated communities must also submit annual reports to EPA that address:

- Status of permit condition compliance
- Appropriateness of identified BMPs
- Progress toward achieving measurable goals for each measure
- Results of data collected and analyzed during the reporting period
- A summary of the activities that will take place during the next reporting period
- Any changes in measurable goals

These activities will ensure that all NPDES-permitted entities are taking actions to improve storm water quality in their jurisdictions.

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US Environmental Protection Agency. 2000. *Storm Water Phase II Compliance Assistance Guide*, Office of Water, EPA 833-R-00-002, March 2000.

US Environmental Protection Agency, Office of Wastewater Management. 2000. *Storm Water Phase II Final Rule Fact Sheet Series:* A series of 15 fact sheets breaking the final rule into separate parts. Accessed at: http://www.epa.gov/owm/sw/phase2

Appendix A. BMP Selection Matrix

Best Management Practice	Targets sediment	Targets bacteria	Targets nutrients	Life cycle costs	Addresses hotspots	Site specific suitability	Public acceptance	Temperature Control	Multiple Applications	Existing Programs
Public education and outreach										
Lawn and garden activities			X				X		X	
Proper disposal of household hazardous wastes				X			X		X	
Pet waste management		X	X				X		X	
Trash management	X						X		X	X
Pollution prevention for business					X		X			X
Educational programs for school age children									X	
Storm drain stenciling		X			X				X	
Informational materials	X	X	X		X				X	X
Using the media	X	X	X		X				X	X
Public participation/involvement										
Community cleanups					X	X	X			
Adopt-A-Stream programs						X	X			
Stakeholder meetings							X		X	X
Community hotlines				X			X			
Storm drain stenciling					X		X		X	
Illicit discharge detection and elimination										
Identify illicit connections		X	X		X					
Repair leaking sewer lines		X	X							X

Best Management Practice	Targets sediment	Targets bacteria	Targets nutrients	Life cycle costs	Addresses hotspots	Site specific suitability	Public acceptance	Temperature Control	Multiple Applications	Existing Programs
Hookup failing septic systems to sanitary sewer		X	X	X			X			X
Prohibit illegal dumping		X	X				X		X	X
Dry weather outfall screening	X	X	X		X					
Construction site storm water runoff control										
Structural BMPs										
Sediment trapping and filtering BMPs	X									
Stabilized construction entrance and roads	X									
Permanent stabilization	X		X							
Runoff controls	X									
Storm drain inlet protection	X									
Temporary cover	X									
Source controls	X	X	X							
Nonstructural BMPs										
Site plan review procedures	X								X	
Ordinance or other regulatory mechanism	X						X		X	
Contractor education	X								X	
Post-construction storm water management										
Structural BMPs										
Storage practices	X			X		X				X
Infiltration practices	X			X		X		X		X
Vegetative practices	X	X	X	X		X		X		X

Best Management Practice	**Targets sediment**	**Targets bacteria**	**Targets nutrients**	**Life cycle costs**	**Addresses hotspots**	**Site specific suitability**	**Public acceptance**	**Temperature Control**	**Multiple applications**	**Existing Programs**
Nonstructural BMPs										
Buffer zones	**X**	**X**	**X**			**X**			**X**	
BMP O&M	**X**	**X**	**X**	**X**					**X**	
Open space design	**X**								**X**	**X**
Comprehensive planning/zoning							**X**		**X**	
Integrative ordinances							**X**		**X**	
Site-based local controls	**X**						**X**		**X**	
Low impact development techniques	**X**	**X**	**X**				**X**	**X**	**X**	
Pollution prevention/good housekeeping for municipal operations										
Parking lot cleaning	X	X	X	X	X				X	X
Street sweeping	X			X	X				X	X
Maintenance of gravel roads	X			X					X	X
Unpaved roads	X			X					X	X
Maintenance of roads and bridges	X			X					X	X
Storm drain system operation and maintenance	X		X	X	X				X	X
Vehicle maintenance practices					X					X
Employee training	X									X
Record keeping										X
Materials management									X	X
Deicing practices	X		X						X	X
Community facility and grounds management (public buildings and facilities)			X	X					X	X

Best Management Practice	Targets sediment	Targets bacteria	Targets nutrients	Life cycle costs	Addresses hotspots	Site specific suitability	Public acceptance	Temperature Control	Multiple Applications	Existing Programs
Storm water system retrofitting	X			X	X					X
Vegetation management										
Riparian area management	X	X	X			X		X		
Revegetation	X	X	X			X		X		
Streambank stabilization	X					X				
Urban forestry						X	X	X	X	X

Appendix B. Definitions

Best Management Practices (BMPs): Activities or structural improvements that help reduce the quantity and improve the quality of storm water runoff. BMPs include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

General Permit: A permit issued under the NPDES program to cover a certain class or category of storm water discharges. These permits reduce the administrative burden of permitting storm water discharges.

Illicit Connection: Any discharge to a municipal separate storm sewer that is not composed entirely of storm water and is not authorized by an NPDES permit, with some exceptions (e.g., discharges due to fire fighting activities).

Maximum Extent Practicable (MEP): A standard for water quality that applies to all MS4 operators regulated under the NPDES Storm Water Program. Since no precise definition of MEP exists, it allows for maximum flexibility on the part of MS4 operators as they develop and implement their programs.

Municipal Separate Storm Sewer System (MS4): A publicly-owned conveyance or system of conveyances that discharges to waters of the U.S. and is designed or used for collecting or conveying storm water, is not a combined sewer, and is not part of a publicly-owned treatment works (POTW).

Non-point Source (NPS) Pollutants: Pollutants from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water.

NPDES: “National Pollutant Discharge Elimination System” the name of the surface water quality program authorized by Congress as part of the 1987 Clean Water Act. This is EPA’s program to control the discharge of pollutants to waters of the United States (see 40 CFR 122.2).

Permitting Authority: The NPDES-authorized state agency or EPA regional office that administers the NPDES Storm Water Program. Pas issue permits, provide compliance assistance, and inspect and enforce the program. In Idaho, EPA Region X in out of Seattle administers the NPDES program.

Storm Water: Precipitation that accumulates in natural and/or constructed storage and storm water systems during and immediately following a storm event.

Total Maximum Daily Load (TMDL): The maximum amount of pollutants that can be released into a water body without adversely affecting the water quality.

Urbanized Area (UA): A Bureau of Census determination of a central place (or places) and the adjacent densely settled surrounding territory that together have a minimum residential population of 50,000 people and a minimum average density of 1,000 people/square mile.

Appendix C. Identifying Applicable Regulatory Requirements

Two sets of regulatory requirements have been incorporated into this source plan: the federal storm water requirements and the Lower Boise River TMDL requirements. The following questions can assist you in determining how you are affected by these requirements.

1. Are you located within the Boise City Limits?

If yes, then you are subject to the Phase I federal storm water requirements.

2. Have you been designated by EPA as regulated under Phase II of the federal storm water requirements?

To date, entities within the following areas in the Treasure Valley have been designated by EPA:

- Portions of Ada County located with the Urbanized Area boundary
- Caldwell
- Portions of Canyon County located within the Urbanized Area boundary
- Eagle
- Meridian
- Nampa
- Middleton

According to 40 CFR 122.26(b)(8), "municipal separate storm sewer means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

i. Owned or operated by a State, city town, borough, county, parish, district, association, or other public body (created to or pursuant to State law)…including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under Section 208 of the Clean Water Act that discharges into waters of the United States.
ii. Designed or used for collecting or conveying storm water;
iii. Which is not a combined sewer; and
iv. Which is not part of a Publicly Owned Treatment Works (POTW).

3. Is storm water runoff from your system discharged into the Boise River either directing, or indirectly via a tributary to the Boise River, or another entity's system?

If yes, then you are subject to the pollutant load allocations specified in the Lower Boise River TMDL. The next step is to further evaluate your system to identify sources, pathways and control opportunities.

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Appendix E. Resources

Storm Water Phase II Final Rule (64 FR 68722) published December 8, 1999.
http://www.epa.gov/owm/sw/phase2

Storm Water Phase II Final Rule Fact Sheet Series, January 2000
A series of 15 fact sheets breaking the final rule into separate parts
http://www.epa.gov/owm/sw/phase2

American Society of Civil Engineers. 1999. *National Stormwater Best Management Practices BMPs Database.*
http://www.asce.org/peta/tech/nsbd01.html

American Public Works Association. 2000. *Designing and Implementing an Effective Storm Water Management Program.*
http://www.apwa.net

Idaho Department of Environmental Quality. *Catalog of Stormwater BMPs for Idaho Cities and Counties.*
http://www2.state.id.us/deq/stormwater-catalog/index.asp

Region 10 Storm Water Phase II Web Site

http://yosemite.epa.gov/R10/WATER.NSF/95537302e2c56cea8825688200708c9a/d3f55362ebfaa5608825698f0059285b?OpenDocument

OTHER WEB SITES OF INTEREST

Center for Watershed Protection.
http://www.cwp.org/

Clean Water Network.
http://www.cwn.org

Local Government Environmental Assistance Network.
http://www.lgean.org/html/whatsnew.cfm?id=74

Stormwater Center
http://www.stormwatercenter.net

Internet Guide to Financing Storm Water Management:
http://stormwaterfinance.urbancenter.iupui.edu/home.htm

Preliminary Data Summary of Urban Stormwater Best Management Practices
http://www.epa.gov/OST/stormwater/

EPA's new "Local Links" page
www.epa.gov/npdes (click on "Links")

National Resource Defense Council:
Storm Water Strategies Report
http://www.nrdc.org/water/pollution/storm/stoinx.asp

Steps to Clean Up Pollution
http://www.nrdc.org/water/pollution/gsteps.asp

StormWater News: A good source of technical information on storm water.
Large library of technical information
http://www.stormwater-resources.com

Texas Nonpoint Source Book
http://www.txnpsbook.org

California Model Urban Runoff Program: A how-to guide for developing urban runoff programs for small municipalities
http://www.swrcb.ca.gov/stormwtr/index.html

Wayne County, Rouge River (Michigan) National Wet Weather Demonstration Project: downloadable report on illicit connections, example Ordinance, and other technical topics
http://www.wcdoe.org/rougeriver/stormwater/index.html

Erosion Control Magazine
http://www.erosioncontrol.com

Stormwater Magazine
http://www.StormH2o.com

Grading and Excavation Contractor Magazine
http://www.gradingandexcavating.com

Wisconsin's statewide stormwater ordinances
http://www.dnr.state.wi.us/org/water/wm/nps/admrules.html

San Mateo Countywide Stormwater Pollution Prevention Program
http://stoppp.tripod.com/

Marin County CA Storm Water Pollution Prevention Program
http://mcstoppp.org/

Longview, WA's Storm Water Utility
http://www.ci.longview.wa.us/utilities/Storm_Water.pdf

Pierce County WA Storm Water Pollution Prevention Manual:
http://www.co.pierce.wa.us/services/home/environ/water/swm/sppman/index.htm

City of Seattle, Public Utilities Surface Water Management Program
http://www.ci.seattle.wa.us/util/surfacewater/